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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,288	01/26/2004	Brian F. Conaghan	99974-00006	9349

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EXAMINER
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VIJAYAKUMAR, KALLAMBELLA M

ART UNIT	PAPER NUMBER
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1793

MAIL DATE	DELIVERY MODE
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08/18/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/766,288	<b>Applicant(s)</b> CONAGHAN ET AL.	
	<b>Examiner</b> KALLAMBELLA VIJAYAKUMAR	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 61 and 63-75 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 61 and 63-75 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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### DETAILED ACTION

Applicants amendment filed 04/29/2009 has been entered. Claim-61 was amended. Claims 61 and 63-75 as amended are currently pending with the application.

Applicant's arguments filed 04/29/2009 have been fully considered, they were found persuasive, but they are not moot in view of new ground of rejection, based on new prior art. Applicants arguments overcome the prior art by Friend et al cited in the last office action.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 61 and 63-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodas et al (US 2003/0124259) in view of Eichelberger et al (US 4,522888).

Kodas et al teach forming conductive features with low resistances over organic substrates such as PCB and flexible substrates such as polyester, polyimide or epoxy by printing an ink composition by screen printing and consolidating the precursor composition (P 0157, 0165, 0176,

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Abstract). The features were formed by heating the composition at temperatures lower than 200C, and preferably lower than 100 C for a period of less than a second (0020, 0179-0180)

The printing ink composition comprised: (i). Nanoparticles of conductive metals such as silver with a particle size of 10-80 nm, (ii). Micron-sized conductive particles where its composition is similar to that of nanoparticles i.e. Ag, and with a particle size of 0.3-3 micron, (iii). Solvent such as terpineol, toluene, ethylene glycol or DMAC <cure temperature lowering agent> and (iv). Binder such as acrylics polymers, epoxies, polyimide and urethanes (Abstract, Para: 0018, 0023, 0028-29, 0035, 0038, 0045, 0049, 0080, 0095, 0099-0102). The prior art further teaches capping the nanoparticles with polymers such as polystyrene/methacrylate or alkane thiolates <ROM> (Para 0045, 0080). The prior art further teaches the addition of flakes such as silver flakes in to the composition (P-0033, 0144). The prior art teaches homogeneously mixing the components in a 3-roll mill (Para 0037).

The prior art fails to teach printing the ink composition containing the specific cure temperature lowering agent per the claim-61.

In the analogous art Eichelberger teaches the composition of conductive inks for forming conductive patterns containing finely divided metals/Fe and binders of polyamide, polyester, polyvinyl chloride, polyvinylidene chloride, and epoxy (CI-7.Ln 1-4; CI-5, Ln 27 – CI-6, Ln 36; CI-4, Ln 61-CI-6, Ln 67). The amount of the conductive particles was about 60-80 wt%, and the conductors had a low resistance in the order milliohms/cm (CI6, Ln 26-33; CI-11; Ln 10-12).

It would have been obvious to a person of ordinary skilled in the art to substitute the binders in the ink composition of Kodas with polyvinyl chloride of Eichelberger as functional equivalent in making printed patterns of conductive circuits over PCB's with predictable results and reasonable expectation of success because they are used in making thick films over substrates for electronic circuits for semiconductor applications, and Eichelberger teaches it to be equivalents with the binders of Kodas in the analogous art.

Pertaining to claim 63, the prior art teaches Silver particles.

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Pertaining to claim 64, the prior art teaches homogeneously mixing the components in a 3-roll mill (Para 0037)

Pertaining to claim 65, the prior art teaches adding 0-15 vol% Ag-nanoparticles (P- 0155), when calculated as wt% would overlap with instant claimed ranges in terms of wt% and prima facie obvious.

Pertaining to claim 66, the combined prior art teaches adding PVC, and addition of even a small amount of the binder would lie close to instant claimed range, and a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985)

Pertaining to claim 67, the prior art teaches Ag nanoparticle with a diameter of 10-80 nm, and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

Pertaining to claims 68-69, the prior art teaches the addition of flakes such as silver flakes in to the composition (P-0033, 0144)

Pertaining to claim 70, the prior art teaches adding Ag-flakes, and addition of a small amount of the flakes would lie close to instant claimed range, and a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

Pertaining to claim 71, the prior art teaches the addition of micron sized particles and flakes with a diameter of 3 micron and 1-10 micron (0033, 38), and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)...

Pertaining to claims 72-73 and 75, the prior art teaches printing the paste over the surface of a substrate by screen printing over organic substrates such as polyester.

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Pertaining to claim-74, the prior art teaches forming conductive features at temperatures less than 200C, and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KALLAMBELLA VIJAYAKUMAR whose telephone number is (571)272-1324. The examiner can normally be reached on M-F 07-3.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 5712721358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KMV/  
Aug 14, 2009.

/Stanley Silverman/  
Supervisory Patent Examiner, Art Unit 1793